

Louisiana Barrier Island Comprehensive Monitoring Program (BICM) Phase 2 - 2015 Characterization of Surficial Sediments in the Early Lafourche Delta, Late Lafourche Delta, Modern Delta, and Chandeleur Islands Regions: Part B – Sediment Sample Distribution Maps

Mark A. Kulp, Ioannis Y. Georgiou, Michael Brown, Andrew Courtois
Pontchartrain Institute for Environmental Sciences
and
James G. Flocks and Thomas Tuten
U.S. Geological Survey Coastal and Marine Science Center

Recommended Citation:

Kulp, M.A., Georgiou, I.Y., Brown, M., Courtois, A., Flocks, J., and Tuten, T., 2017B, Louisiana Barrier Island Comprehensive Monitoring Program (BICM) Phase 2 - 2015 Characterization of Surficial Sediments in the Early Lafourche Delta, Late Lafourche Delta, Modern Delta, and Chandeleur Islands Regions: Part B – Sediment Sample Distribution Maps, submitted to Louisiana Coastal Protection and Restoration Authority 10 pp.

INTRODUCTION

It is widely recognized and well documented that barrier islands and deltaic headland shorelines of the Louisiana Coastal Zone are rapidly retreating landward and degrading (e.g. Martinez et al., 2009). High rates of delta plain subsidence, ongoing eustatic sea-level rise, sediment starvation, and processes such as storm impacts collectively contribute to this shoreline loss as shoreline sediment is eroded or becomes inundated by marine waters (Penland and Ramsey, 1990). The amount of shoreline retreat along coastal Louisiana has been shown to be as much as 27 m yr⁻¹ locally (e.g. Wine Island) between 2004 to 2012 and 21 m yr⁻¹ (West Belle Pass) between the 1950's and 1998 (Byrnes et al., 2017). The shoreline change has been a contributing factor to the more than 100 km² of annual land loss that has been documented for some select historic time frames across the region (Couvillion et al., 2011).

PURPOSE

To more effectively identify the magnitude, rates, and processes of shoreline change a Barrier Island Comprehensive Monitoring program (BICM) was developed in 2005 by the Louisiana Department of Natural Resources (LDNR), and implemented by LDNR, University of New Orleans-Pontchartrain Institute for Environmental Sciences (UNO-PIES), and the U.S. Geological Survey (USGS) as a framework for a coast-wide monitoring effort. A significant component of this effort includes documenting the historically dynamic morphology of the Louisiana nearshore, shoreline, and backshore zones. This aspect of the program was designed to complement other more area-specific monitoring programs that are currently underway through the support of agencies such as the Louisiana Department of Natural Resources and the Coastal Protection and Restoration Authority (CPRA) and U.S. Army Corp of Engineers. Because of legislative changes the CPRA is now the primary authority overseeing the completion of BICM projects.

The advantage of BICM over current project-specific monitoring efforts is that it will provide long-term morphological datasets on all of Louisiana's barrier islands and shorelines; rather than just those islands and areas that are slated for coastal engineering projects or have had construction previously completed. BICM additionally specifically provides a larger proportion of unified, long-term datasets that will be available to monitor constructed projects, plan and design future barrier island projects, develop operation and maintenance activities, and assess the range of impacts created by past and future tropical storms. The development of coastal models, such as those quantifying littoral sediment budgets, and a more advanced knowledge of mechanisms forcing large-scale coastal evolution becomes increasingly feasible with the availability of BICM regional datasets. These factors constitute critically important elements of any effort that is aimed at effective coastal restoration, sediment nourishment, or management.

THIS REPORT

This report is Part B of the 2017 BICM Sediment Sampling reports, a series focusing on the sedimentary characteristics of the Louisiana Coastal Zone. It is not intended to be used as a stand-alone reference without a complete understanding of the methodology detailed in Part A (Kulp et al., 2017A) and the information provided within reports of the 2011 sediment sampling reports (Kulp et al., 2011A,B). The maps presented herein show the distribution of sediments that were collected during the 2015 sandy barrier sampling effort and additional reports will provide information on the grain size characteristics of the sampled areas. Figure 1 shows the distribution of BICM regions and figures 2-7 provide the distribution of sediment samples acquired during this project within the regions of figure 1.

ACKNOWLEDGEMENTS

Funding for this project was from Coastal Protection and Restoration Authority (CPRA) through the United States Geological Survey (USGS) and the Gulf Coast Cooperative Ecosystems Study Unit (CESU) agreement G15AC00152. Darin Lee and Syed Khalil (CPRA) provided much input and feedback for location selection and other aspects of the project. Field and laboratory assistance was provided by Tara Yocum, Joe Frank, Rachelle Thomason, Joshua Alarcon, Joshua Flathers, Brian Carter, Eric Buller, Trey Kramer, Andy Lade, Julian Sosebe, and Duncan FitzGerald.

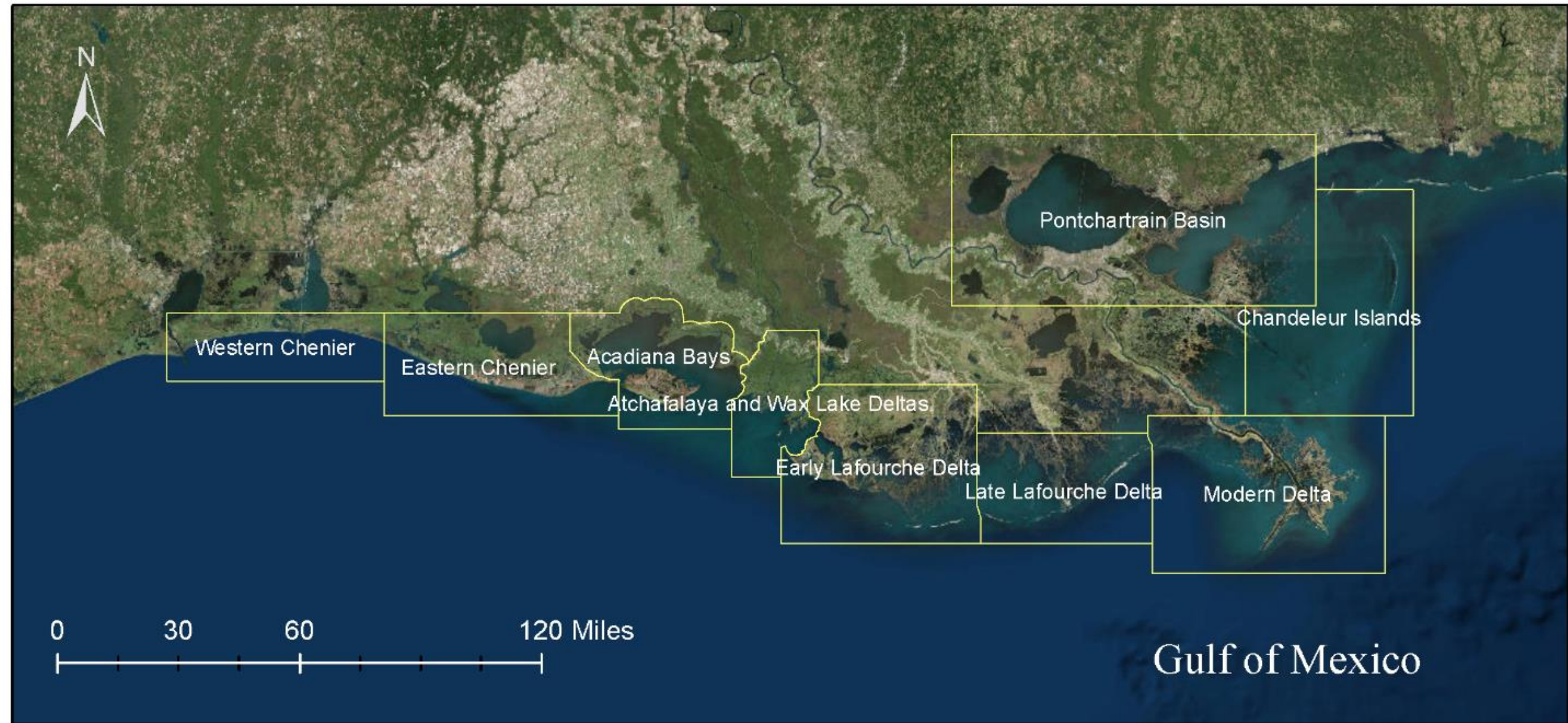


Figure 1. Base map depicting the 2015 Barrier Island Comprehensive Monitoring Program regions. Sediment sampling of this report took place across the sandy barriers of the Chandeleur Islands, Modern Delta, Late Lafourche Delta, and Early Lafourche Delta.

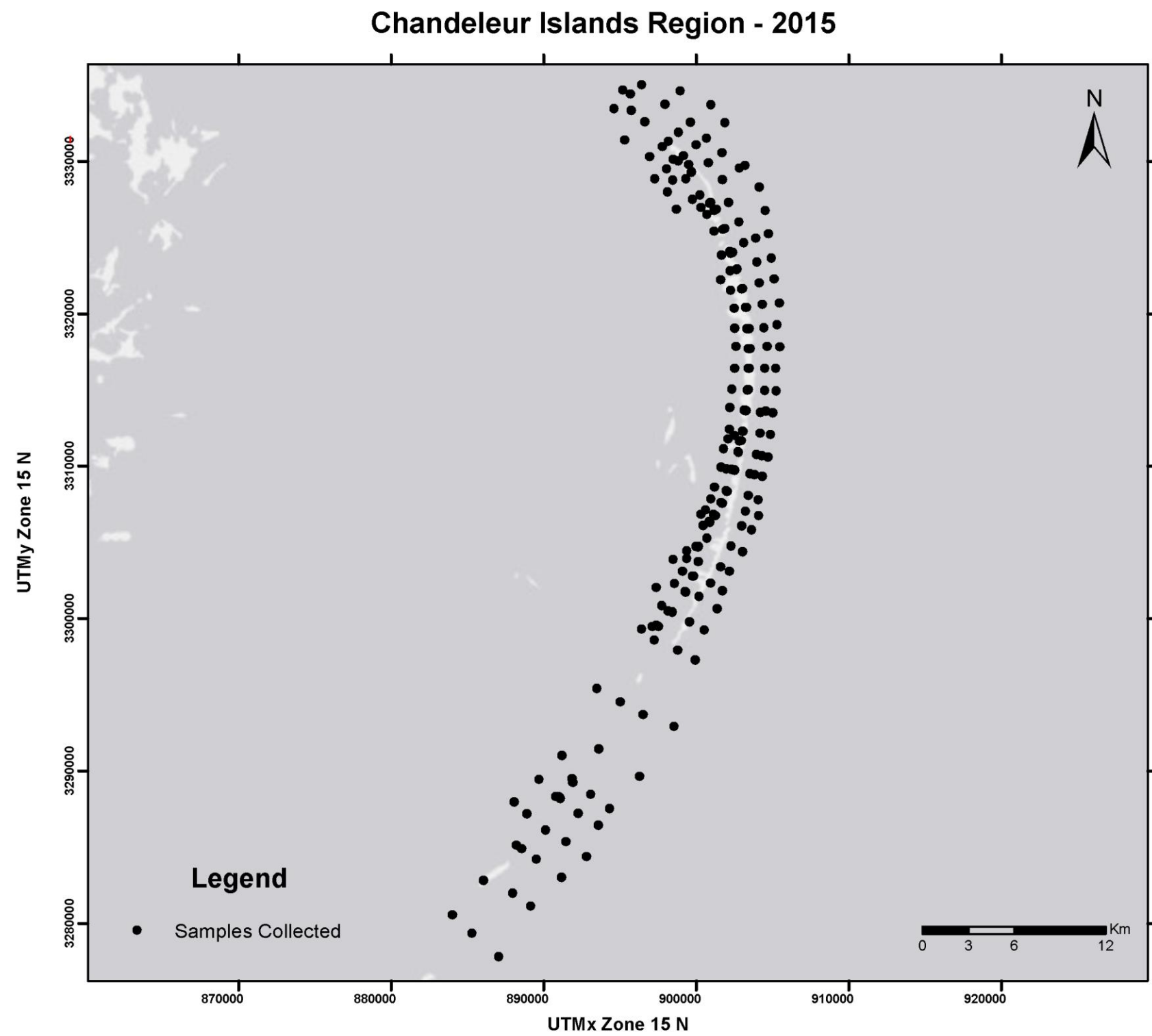


Figure 2. Base map of sediment samples within the Chandeleur region.

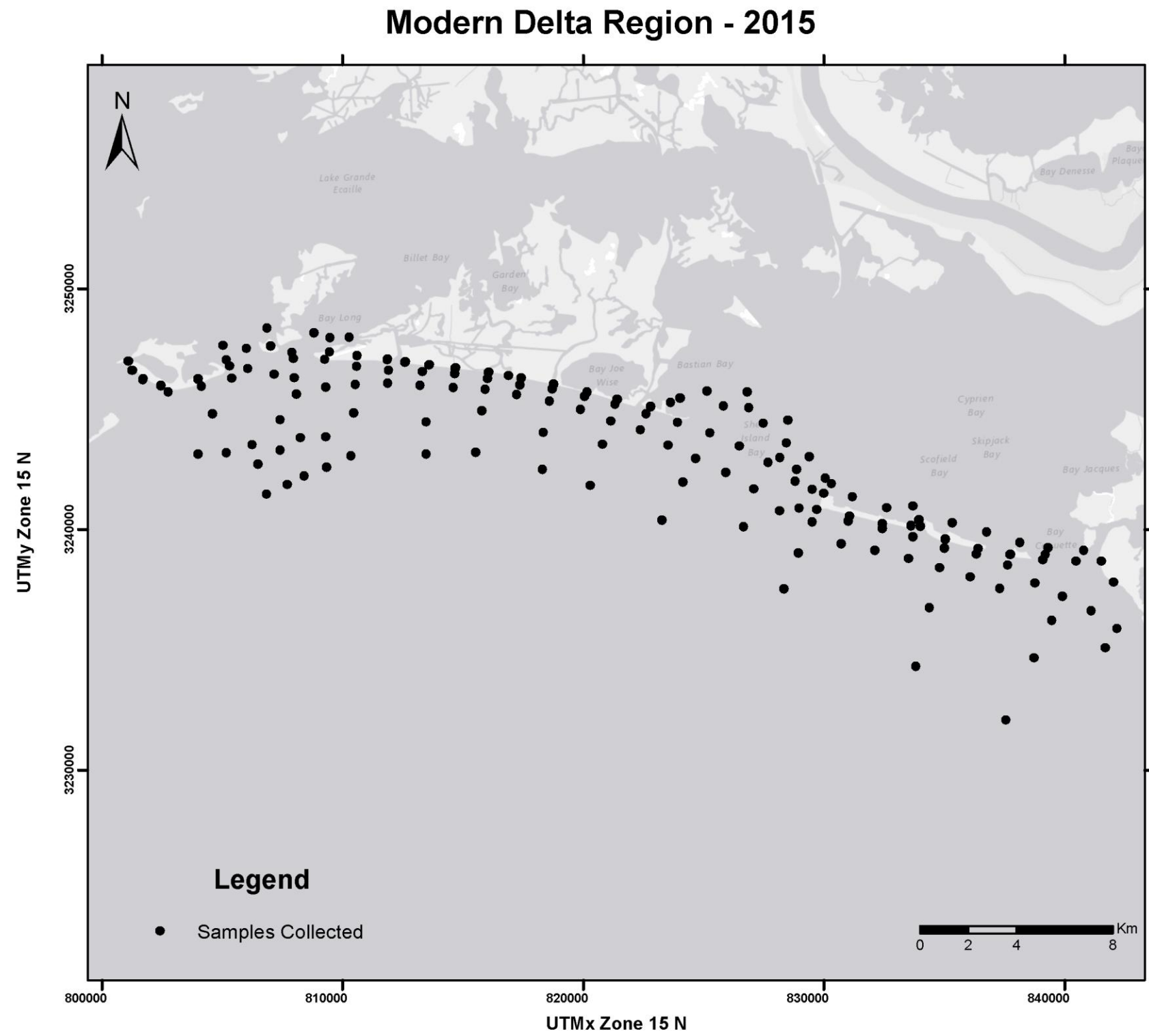


Figure 3. Base map of sediment samples within the Modern Delta region.

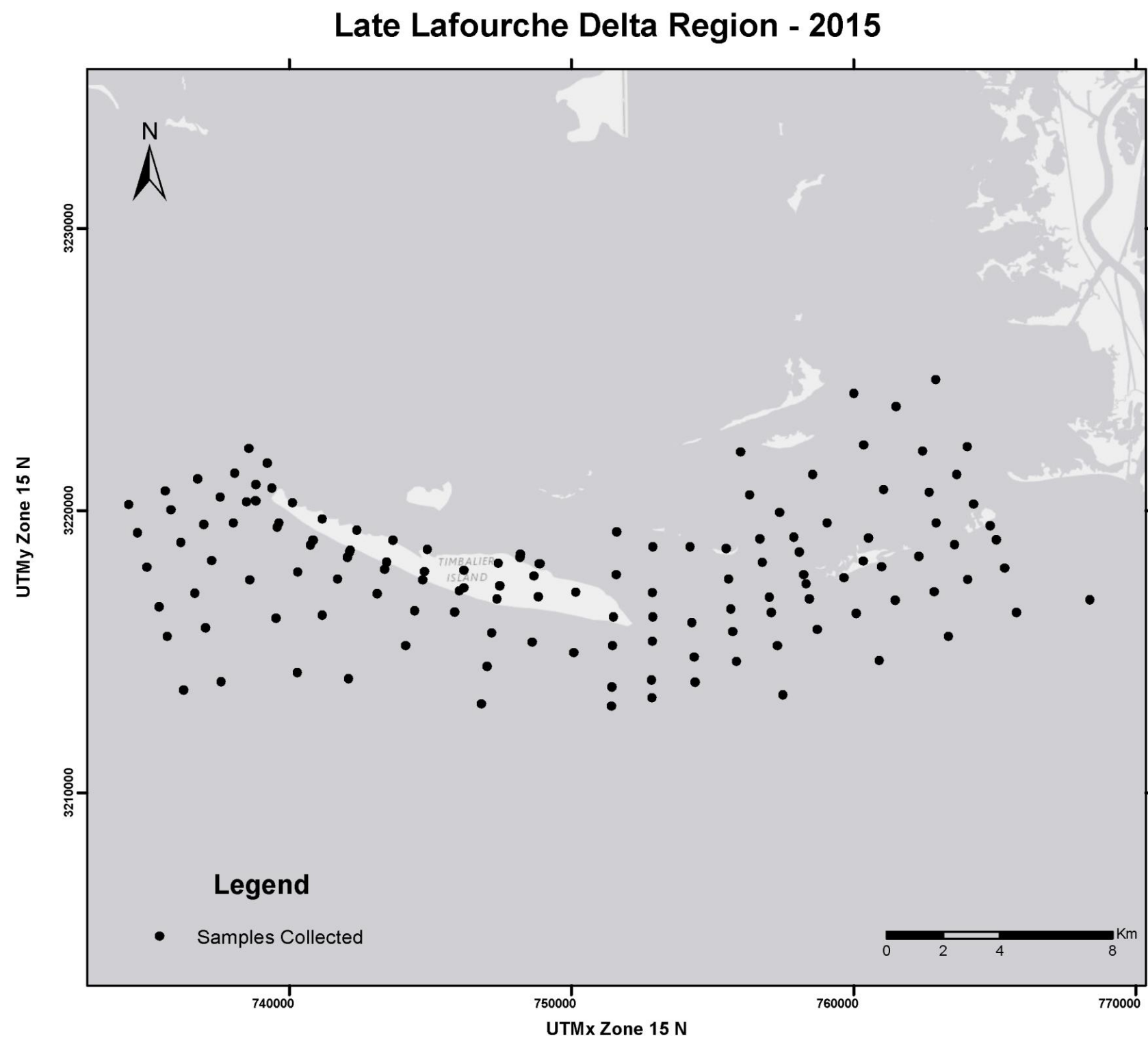


Figure 5. Base map of sediment samples within the Late Lafourche Delta region.

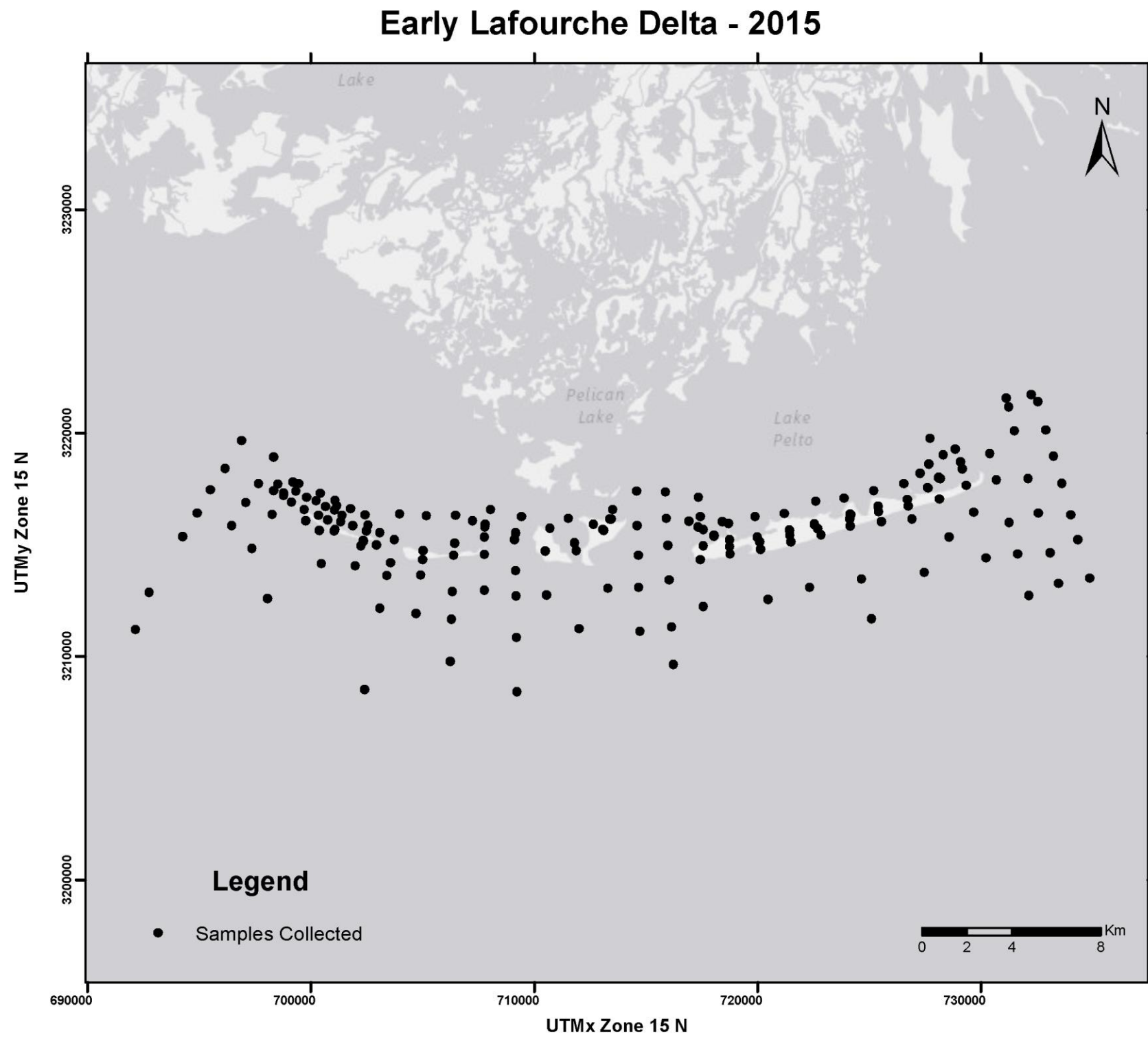


Figure 6. Base map of sediment samples within the Early Lafourche Delta region.

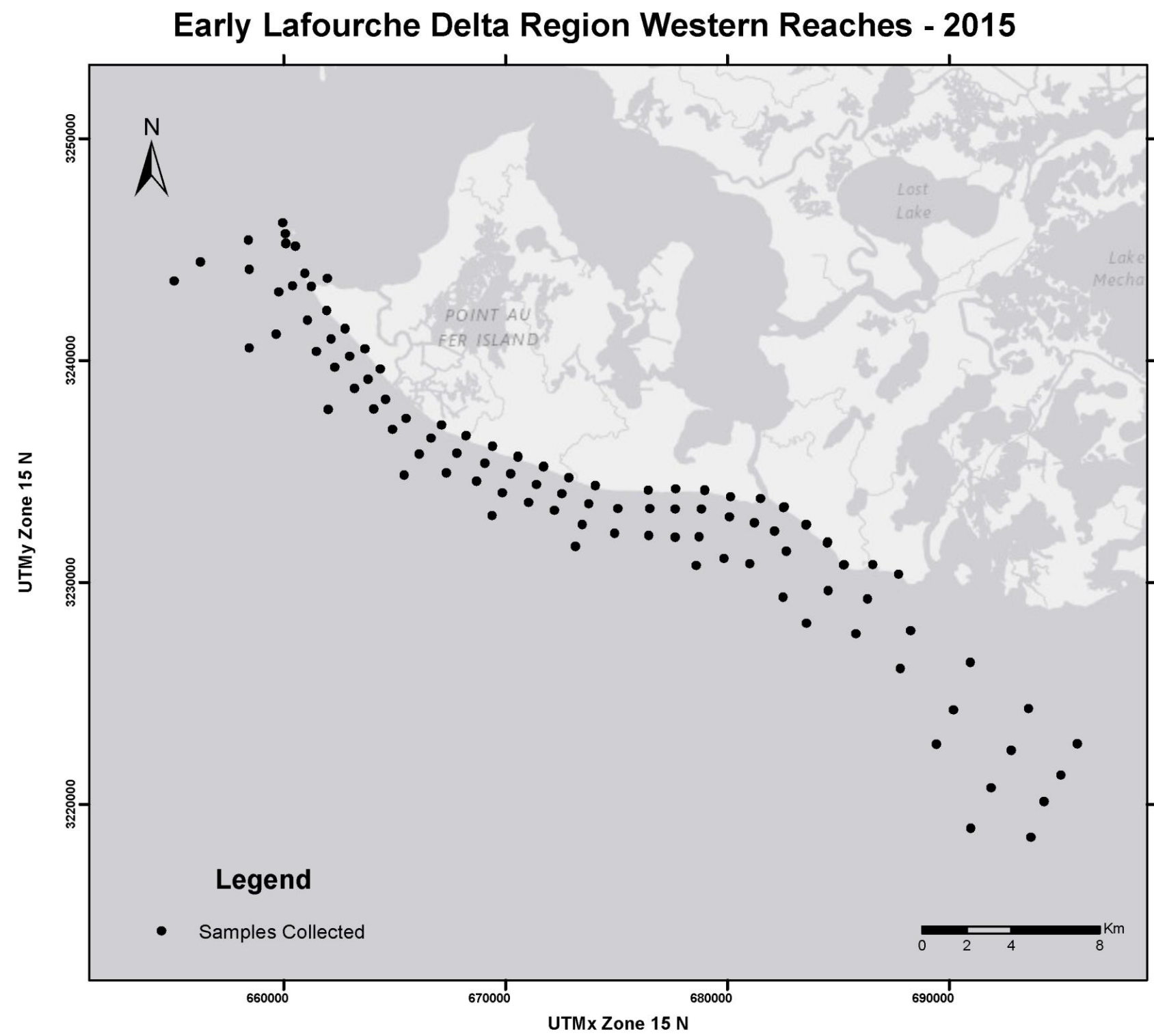


Figure 7. Base map of sediment samples within the Early Lafourche Delta region Western reaches.

REFERENCES

- Byrnes, M.R., Berlinghof, J.L., Griffee, S.F., Underwood, S.G., and Lee, D.M., 2017, Louisiana Barrier Island Comprehensive Monitoring Program (BICM): Phase 2 – Shoreline Compliation and Change Assessment, submitted to Louisiana Coastal Protection and Restoration Authority, 41 pp. plus appendices.
- Couvillion, B.R., Barras, J.A., Steyer, G.D., Sleavin, W., Fischer, M., Beck, H., Trahan, N., Griffin, B., and Heckman, D., 2011, Land Area Change in Coastal Louisiana from 1932 to 2010, U.S. Geological Survey Scientific Investigations Map 3164, scale 1:265,000, 12 pp.
- Kulp, M.A., Georgiou, I.Y., Brown, M., Courtois, A., Flocks, J., and Tuten, T., 2017, Louisiana Barrier Island Comprehensive Monitoring Program (BICM) Phase 2 - 2015 Characterization of Surficial Sediments in the Early Lafourche Delta, Late Lafourche Delta, Modern Delta, and Chandeleur Islands Regions: Part A - Data Collection, Sample Processing and Products, submitted to Louisiana Coastal Protection and Restoration Authority 9 pp. plus appendices.